

Investigation of sandy soil dynamic strength by the method of self-excited vibration

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Abstract

© SGEM 2017. This paper presents a new approach to the evaluation of dynamic soil strength based on the hypothesis of discreteness of the deformation process - a method of self-excited vibration. This method was first discovered at the sandy soil shear test. The destruction of the soil is viewed as cyclical and consists of two phases: the static and dynamic. On static stage deformation is slow, with energy accumulation. In the dynamic there is a rapid discharge, accompanied by a sharp increase in strain. Self-excited vibrations (which can be named auto oscillation) are caused by the fact that the soil accumulates potential energy only up to a certain limit, which depends on its density, and then there is the destruction of soil structure, the instantaneous relaxation of shear resistance and plastic deformation slip. Thereafter, under the influence of an external load soil again accumulates energy gradually, and then being unloaded. Strength parameters (angle of sliding friction ϕ_f , the angle of gearing ϕ_c and soil's fractions connection Z_w) defined at each stage, take into account the kinetics of the process of destruction and are proposed as dynamic soil strength parameters.

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Keywords

Deformation discreteness, Dynamic, Sandy soil, Self-excited vibration

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